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Variants of the Femur

Michael Finnegan
Kansas State University

M. A. Faust
George Washington University

28. *Anterior ethmoid foramen exsutural* (Fig. 5)

The anterior ethmoid foramen pierces the medial wall of the orbit. It normally lies on the suture between the medial edge of the orbital plates of the frontal and ethmoid bones, but it occasionally emerges above the suture.

29. *Posterior ethmoid foramen absent* (Fig. 5)

The posterior ethmoid foramen lies just behind the anterior ethmoid foramen on the same suture line. Its absence can only be scored satisfactorily in well-preserved skulls.

30. *Accessory infraorbital foramen present* (Figs. 3, 6)

A second foramen may lie immediately adjacent to the infraorbital foramen.

A. VARIANTS OF THE FEMUR

1. Allen's Fossa (Fig. 1A)

The Cervical Fossa (depression) of Allen, when present, is usually located near the anterior superior margin of the femoral neck close to the border of the head. It can vary from a small depression to a large eroded area one centimeter square where the cortical bone has been removed exposing underlying trabeculae. The border of this fossa may have a ridge or thickening around it reminiscent of an inflammatory response. To be scored as present, the underlying trabeculae must be seen so that this variant can be differentiated from variants 2 and 3 (see below).

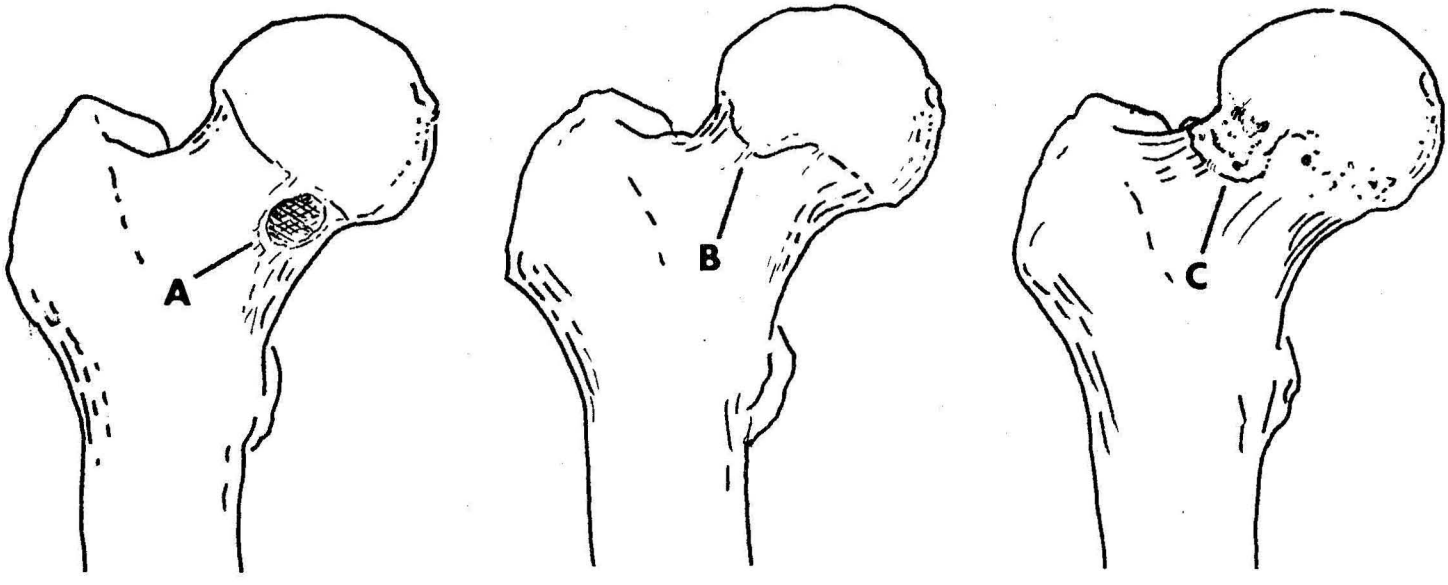

Fig. 1. The reaction area of the femoral neck.

2. Poirier's Facet (Fig. 1B)

Poirier's Facet is scored as present when there is a noticeable, however slight, bulging of the articular surface of the femoral head toward the anterior portion of the femoral neck. This facet is necessarily smooth and is not to be confused with plaque formation (see 3 below).

3. Plaque (Fig. 1C)

This variant is found in the same reaction area as 1 and 2 above. Plaque formation is scored as present when an overgrowth or bony scar can be defined as extending from the area of Poirier's facet on the femoral head down onto the femoral neck which often surrounds or covers Allen's fossa. In rare cases, all of the above variants may be defined on a single femur.

4. Hypotrochanteric Fossa (Fig. 2A)

The hypotrochanteric fossa is located in the superior posterior part of the femoral diaphysis between the gluteal ridge and the lateral margin. This variant is found in close association, but not correlated with, the gluteal ridge and the third trochanter (see below).

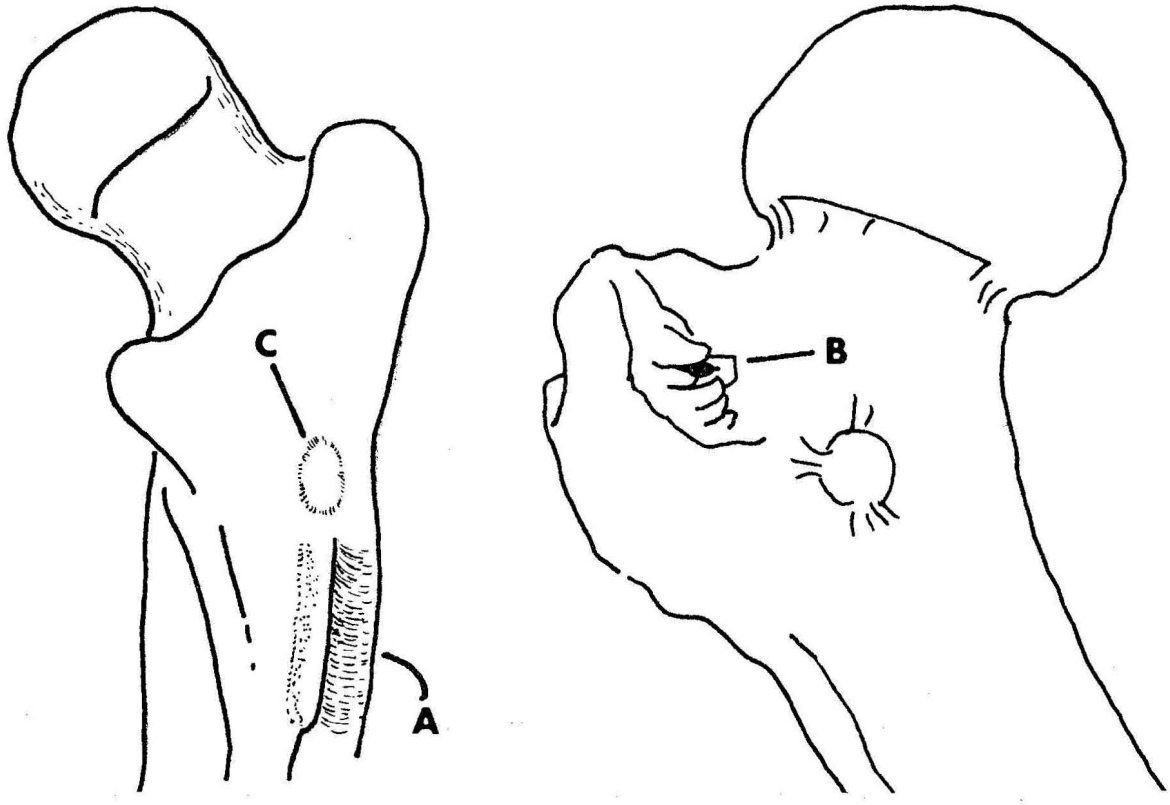

Fig. 2. Variants of the posterior surface of the femur.

Although various authors have defined a variety of ways to score the fossa, we will use a division of present or absent, realizing that the differences are often quite subjective.

5. Exostosis in Trochanteric Fossa (Fig. 2B)

Rarely, there is a tubercle to be found in the trochanteric fossa. More frequently, various amounts of bony spicules or exostosis can be observed in the otherwise smooth fossa. The tubercle may be long and with cusps like a molar tooth. We will consider the fossa as having two variations: either a smooth surface or the display of the tubercle or exostosis.

6. Third Trochanter (Fig. 2C)

Many times a rounded tubercle can be found at the superior border of the gluteal crest. When present, its morphology is very much like that of the lesser trochanter: an oblong, rounded or conical bony tuberosity, which develops instead of, or above the gluteal ridge. The difference between the third trochanter and the gluteal ridge is therefore based on kind and not degree of development.

B. VARIANTS OF THE TIBIA

7. Medial Tibial Squatting Facet (Fig. 3A)

The lower margin of the anterior surface of the tibia

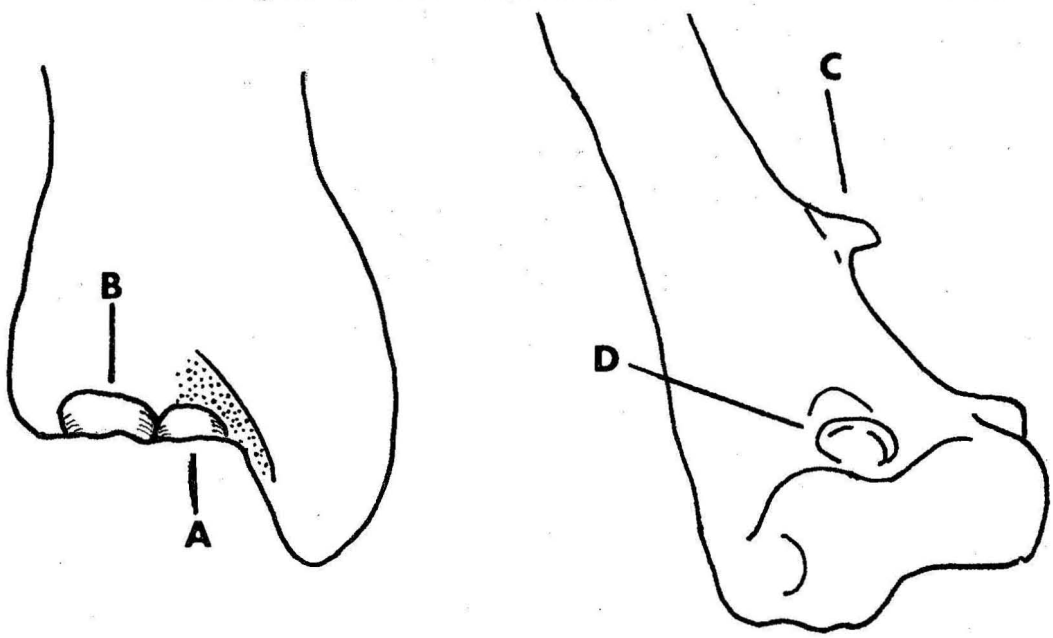

Fig. 3. Variants of the distal tibia and humerus.

presents a rough transverse depression for the attachment of the articular capsule of the ankle joint. This depression can usually be divided into medial and lateral fossae divided by a raised area. These fossae usually show increased vascular pitting. Frequently, the inferior articular surface is extended into the medial depression fossa and is scored as a medial squatting facet.

8. Lateral Tibial Squatting Facet (Fig. 3B)

This occurs when the inferior articular surface extends into the lateral fossa of the transverse depression (see above).

C. VARIANTS OF THE HUMERUS

9. Supracondyloid Process (Fig. 3C)

Rarely, a small bony process arising from the medial supracondylar ridge 5 to 7 cm above the medial epicondyle may be observed. It is usually pointed with the point directed downward, anteriorly and medially. It may vary in length from 2 to 20 mm.

10. Septal Aperture (Fig. 3D)

Frequently an aperture is found in the bony septum that separates the olecranon from the coronoid fossa. When this aperture is present it is scored, but caution must be taken, especially in archaeological material, that the aperture is not the result of post mortum perforation or simply small vascular foramina.

D. VARIANTS OF THE INNOMINATE BONE

11. Acetabular Crease (Fig. 4A)

Often there is a fold, pleat or crease which can be identified on the articular surface of the acetabulum. This defect may arise anywhere along a line from the acetabular fossa superiorly to the border of the articular surface. The defect is not a remnant of faults in the fusion of the ilium with either the pubis or ischium, as the pleat usually lies between these junctures. Scored present or absent.

12. Pre-auricular Sulcus (Fig. 4B)

Frequently there exists a sulcus running inferiorly and posteriorly between the greater sciatic notch and the auricular surface, bordering on the latter. The sulcus

may be, in part, the result of a morphological elevation of the inferior portion of the auricular surface on some innominate bones. This variant is only scored as present when it is defined below the Pectineal Line, and thus confining it to the true pelvis.

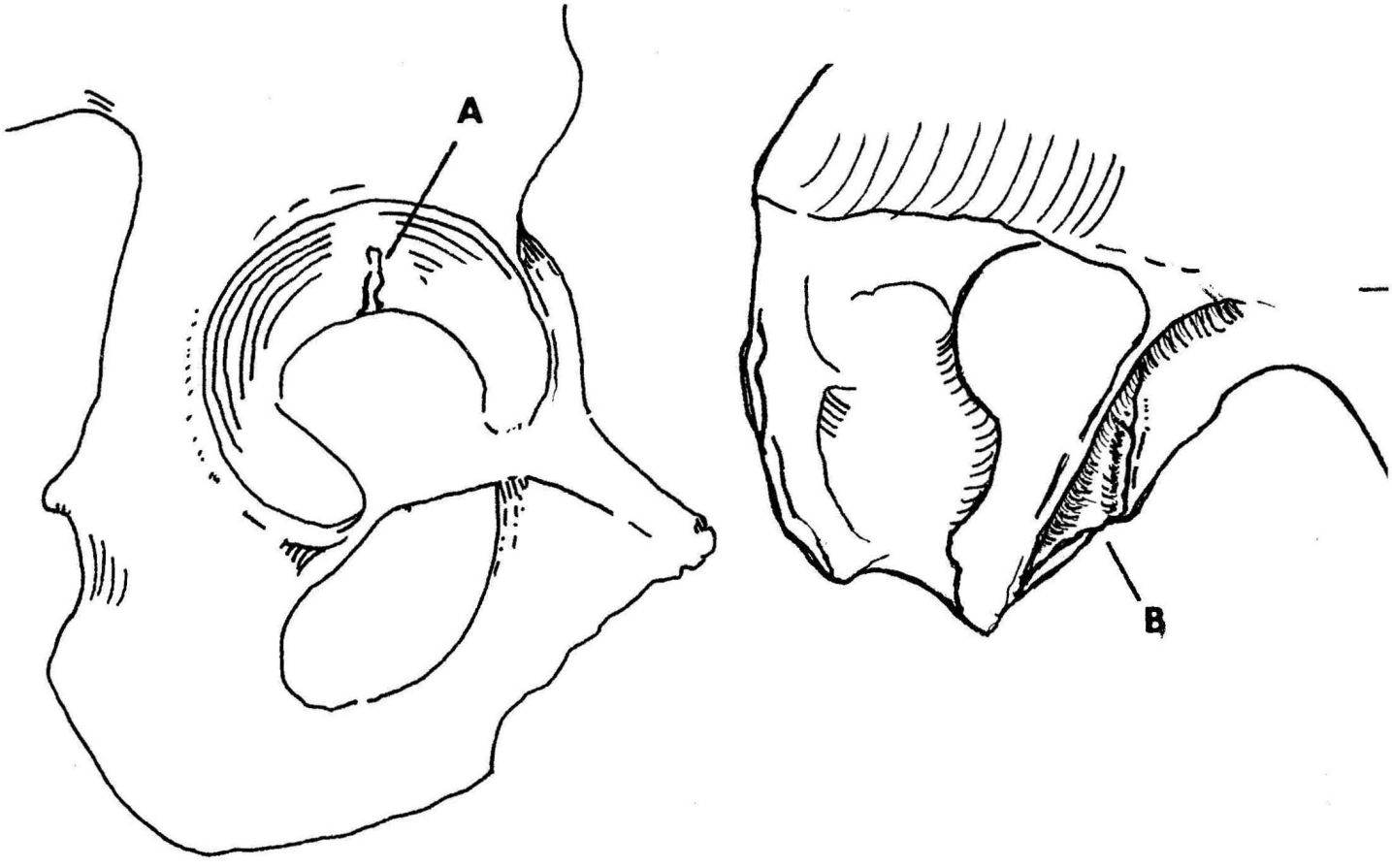

Fig. 4. Variants of the innominate bone: acetabular crease and pre-auricular sulcus.

13. Accessory Sacral Facets (Fig. 5A,B)

An articular facet can often be observed either on the sacrum, ilium or both, posterior to the auricular surface. On the ilium, it is located on the iliac tuberosity for the sacro-iliac ligament, while on the sacrum it is observed on the sacral tuberosity. In order to be scored as present, the facet must lie inferiorly to the superior border of the auricular surface and must be distinguishable and discrete from the auricular surface itself.

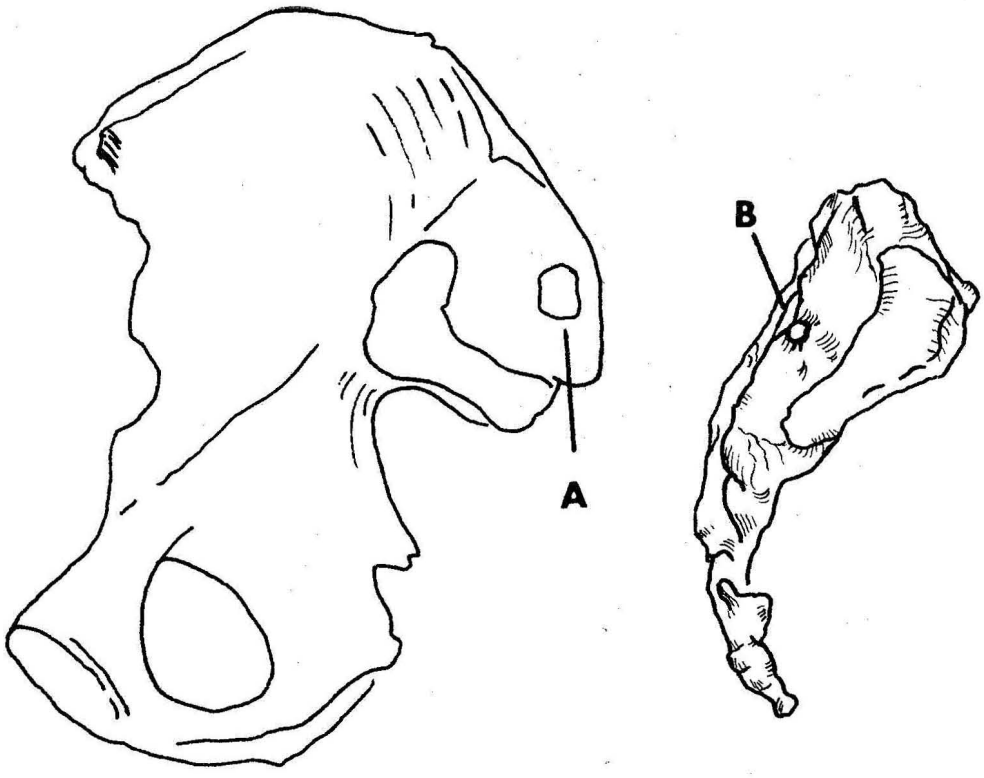

Fig. 5. Accessory sacral facet.

E. VARIANTS OF THE SCAPULA

14. Acromial Articular Facet (Fig. 6A)

An articular facet may be present on the inferior surface of the acromial process. This facet is usually oval with the long axis running posteriorly and inferiorly from the attachment of the coracoacromial ligament. Scored present or absent.

15. Suprascapular Foramen (Fig. 6B)

Rarely, the suprascapular notch is converted to a foramen by complete ossification of the suprascapular ligament. The complete foramen is scored as present.

16. Circumflex Sulcus (Fig. 6C)

Often, a sulcus for the circumflex artery can be found on the posteriolateral border of the scapula nearly bisecting the origin of the teres minor muscle. Scored present or absent.

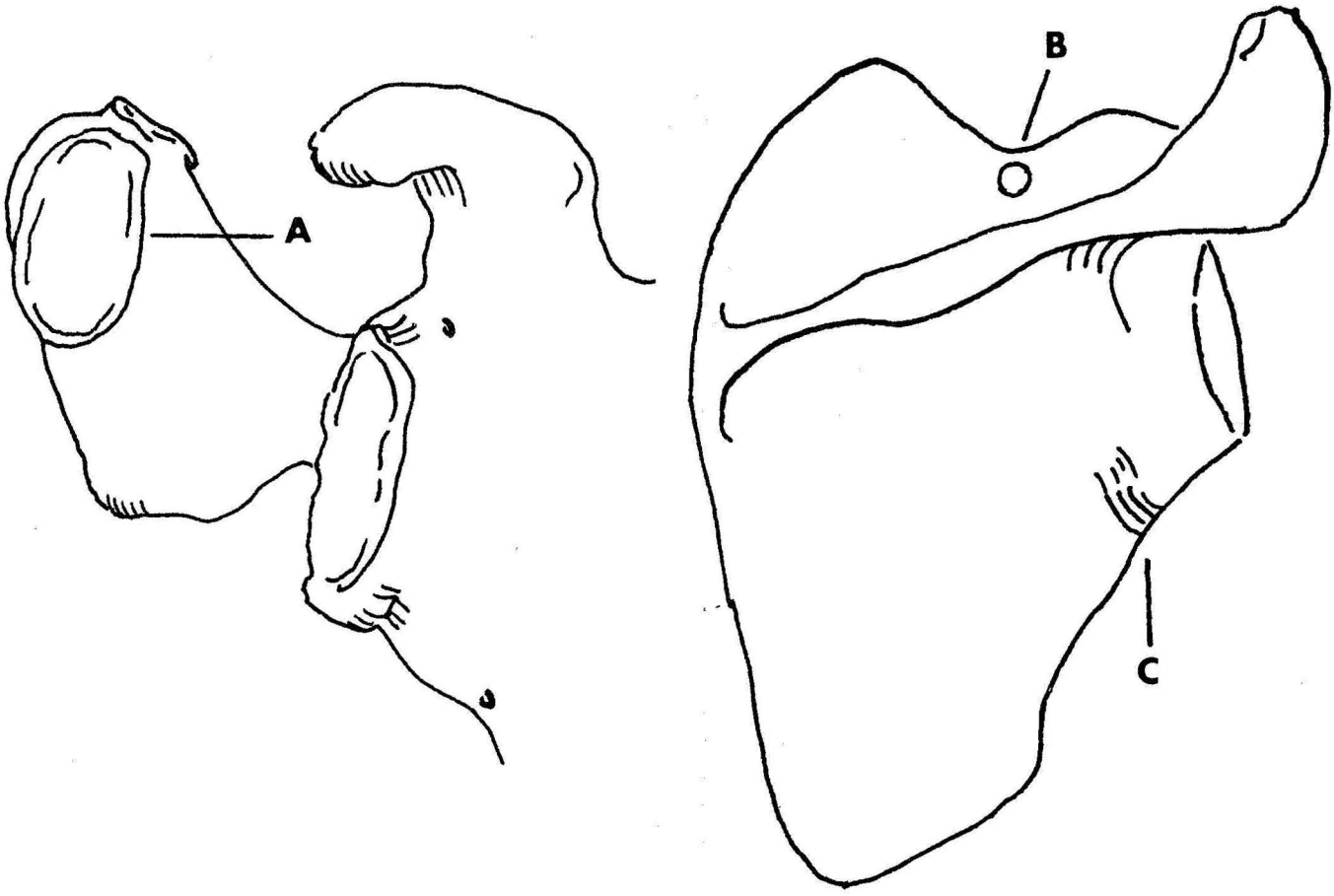

Fig. 6. Variants of the scapula.

F. VARIANTS OF THE PATELLA

17. The Vastus Notch (Fig. 7A)

A small notch is often observed in the superolateral angle of the patella. This is scored when the area for the insertion of the Vastus lateralis tendon shows some concavity. The border of this notch must be smooth (see below) to be scored as present.

18. Vastus Fossa (Fig. 7B)

The Vastus fossa, when present, is a small depression just anterior to the Vastus notch, although it can be defined with or without the presence of the notch.

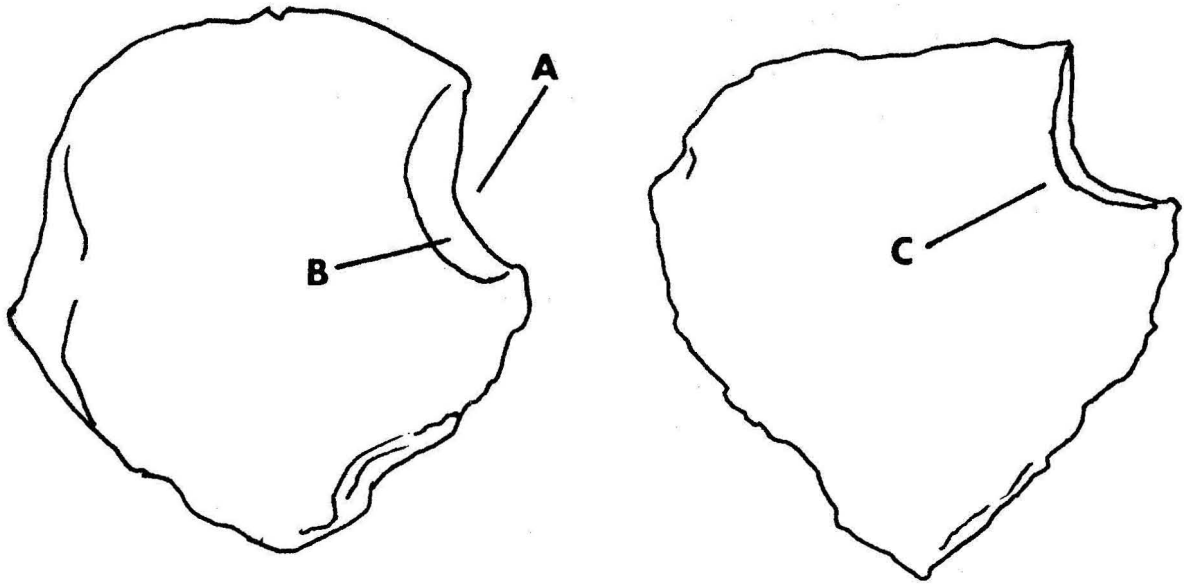

Fig. 7. Variants of the patella.

19. Emarginate Patella (Bipartite Patella) (Fig. 7C)

Emarginate patella is scored when a notch is present in the supero-lateral border of the patella as was the Vastus notch. However, in this case, the notch is noticeably larger and, unlike the Vastus notch the emarginate notch is very rough, leaving the impression that a portion of the bone had been pulled away from the patella as a whole. This is, in fact, the case as rarely one can find the supero-lateral angle as a separate, or many small, ossicles. When the emarginate patella is scored as present, the Vastus notch and fossa must be absent.

G. VARIANTS OF THE TALUS

20. Os Trigonum (Fig. 8A,B)

The posterior border of the talus can be divided by the groove of the flexor hallucis longus. Immediately lateral to this groove is a small process which, when developed, is known as Stieda's process. When this process is not fused or only partially fused to the posterior border of the talus, it is known as the os trigonum. In archaeological material this variant can be detected when Stieda's process is present and a fusion line can still be ascertained or when the facet for the articulation of the os trigonum on the talus can be observed. In the latter case, the os trigonum usually remains at the excavation site undetected.

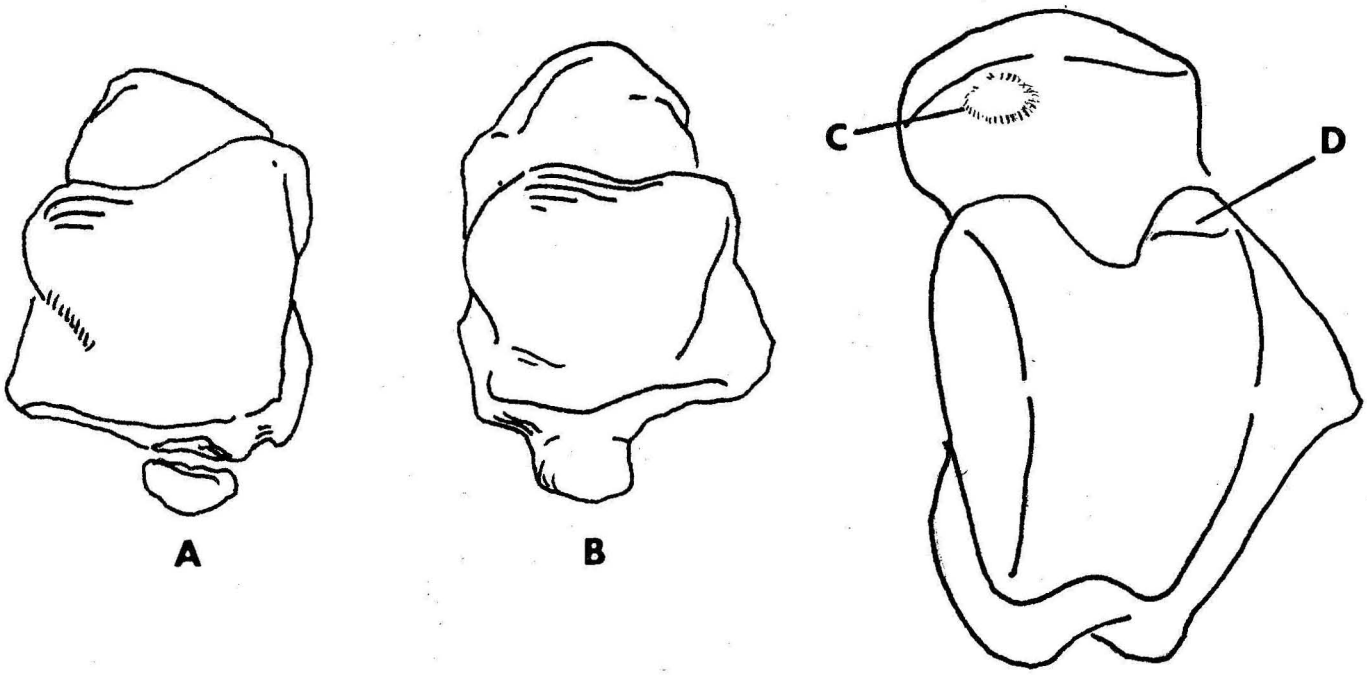

Fig. 8. Variants of the talus.

21. Medial Talar Facet (Fig. 8C)

The upper medial surface of the neck of the talus may present a facet which does not follow the line of curvature of the trochlear surface. Although the position of this facet is variable, it is nonetheless quite distinct when present.

22. Lateral Talar Extension (Fig. 8D)

An extension of the lateral third of the anterior trochlear margin onto the neck of the talus is often present. It is more common than the medial facet of the talus, but not as common as the lateral tibial squatting facet.

23. Inferior Talar Articular Surface (Fig. 9A)

The inferior surface of the head of the talus may present one large articular surface or may be divided into two surfaces which are either two discrete facets, or continuous, but are found to be on different planes. This variant is scored as single or double.

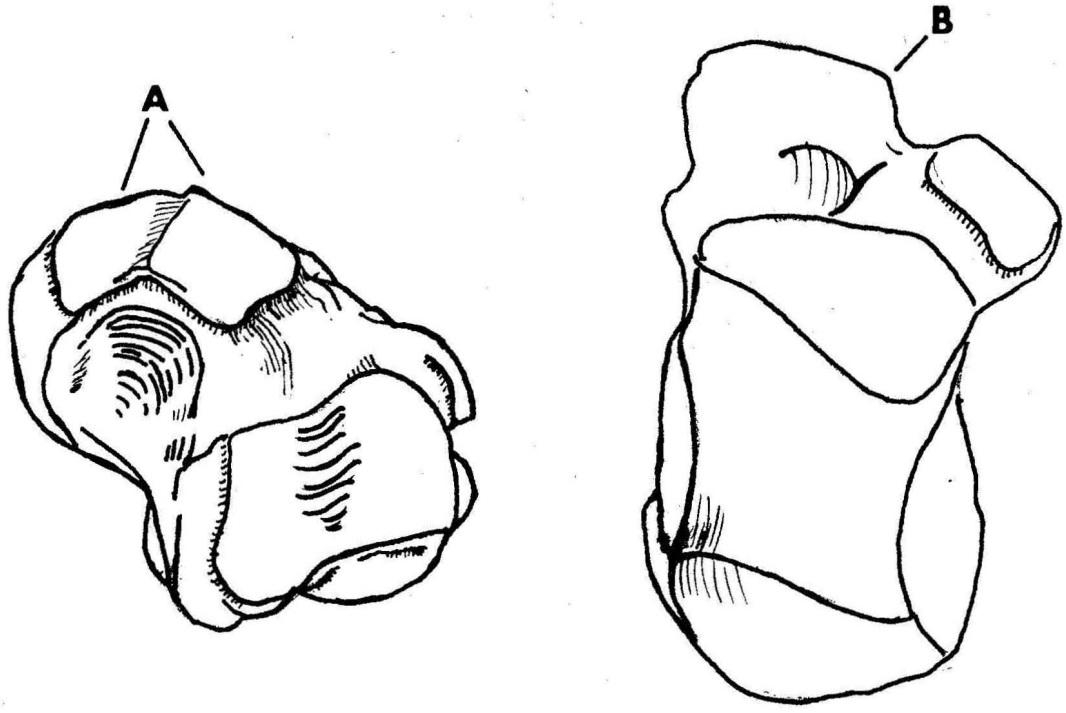

Fig. 9. Variants of the talus and calcaneus

H. VARIANTS OF THE CALCANEØUS

24. Anterior Calcaneal Facet (Fig. 9B, 10A)

The anterior and middle calcaneal articular facets may take a variety of shapes: a single ovoid facet, a partially conjoined or hourglass-shaped facet, two discrete facets, or the anterior facet may be totally missing. Therefore, unlike the other post-cranial variants, this variant has three character states which will be scored as absent when the anterior facet is missing, single when there is but one continuous facet (including the hourglass-shape) and double when there are two discrete facets.

25. Peroneal Tubercle (Fig. 10B)

Three processes can be defined on the lateral surface of the calcaneus anteriorly we find the peroneal tubercle; medially we find a raised surface for the calcaneo-fibural ligament; and posteriorly and inferiorly we find the lateral process. The anterior or peroneal tubercle may be absent or conjoined with the area for the calcaneo-fibural ligament, such that the peroneal tubercle can not be distinguished. As a result, this variant is scored as absent. When we can define the peroneal tubercle, it is scored as present.

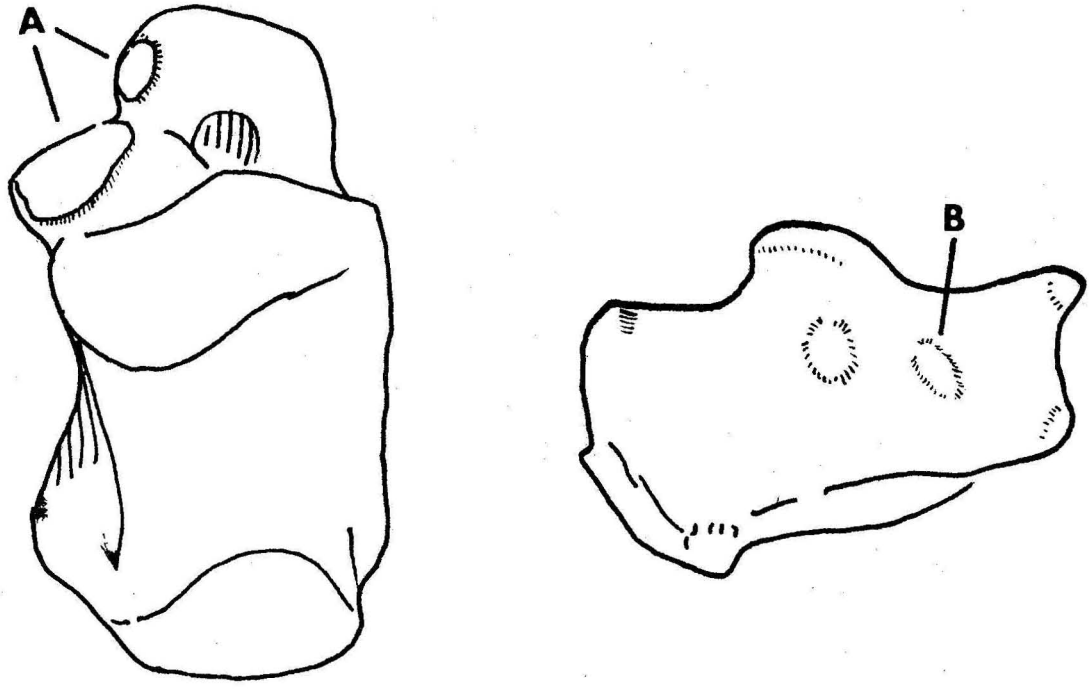

Fig. 10. Variants of the calcaneus

I. VARIANTS OF THE VERTEBRAE

26. Atlas Facet Form (Fig. 11A)

The superior articular facets of the atlas may take a variety of forms: there may be a long more-or-less oval facet, or there may be two distinct facets. The distinct facets may be separated either by a groove or a ridge of bone between the facets.

27. Posterior Bridge (Fig. 11B)

The most common variant of the atlas is a bridge of bone extending from the superior articular process posteriorly to the posterior arch. This transforms the sulcus for the vertebral artery to a tunnel. Although bony spicules may fall from the superior articular process or arise from the posterior arch, the variant is not scored unless a complete bridge can be defined (see below).

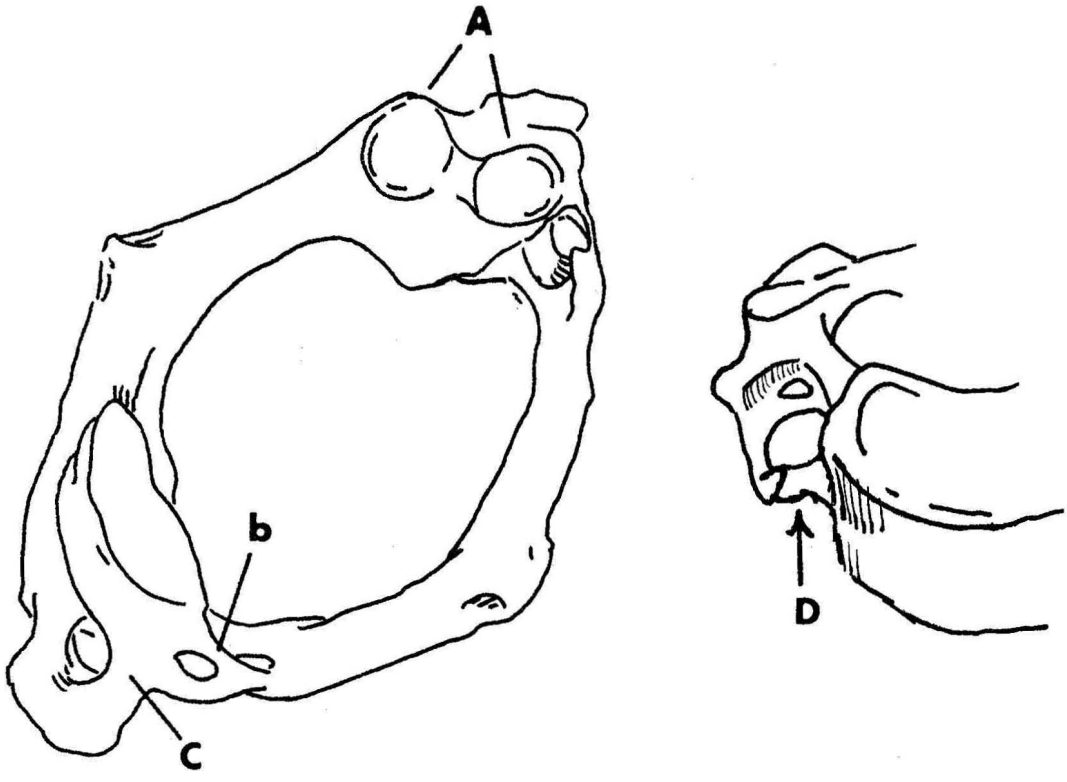

Fig. 11. Variants of the atlas and other cervical vertebrae.

28. Lateral Bridge (Fig. 11C)

The lateral bridge is the bridge of bone extending from the superior articular process laterally to the transverse process. This bridge also creates a tunnel for the vertebral artery. Some vertebrae deserve close observation, because combinations of these bridges can be seen and additional bridges may connect the lateral bridge with the posterior bridge.

29. Transverse Foramen Bipartite (Fig. 11D)

Frequently, one or more, of the transverse foramen of the 3rd through the 7th cervical vertebrae will be bipartite. When this is observed, a fraction is entered on the recording sheets representing bipartite foramen of total foramen observed.

30. Cleft Neural Arch (Fig. 12A,B)

Rarely, a cleft can be observed in one or more vertebrae from the first cervical through the 12th thoracic. When the cleft occurs it may take a variety of locations: it may be seen in the midline dividing the spinous process or it may effect the arch of one side only.

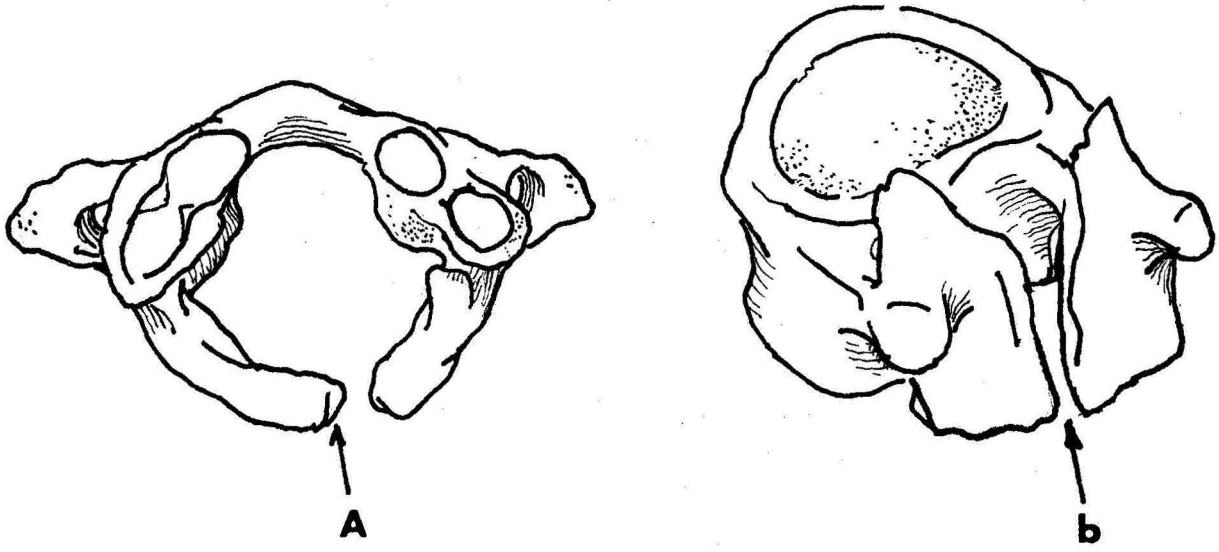

Fig. 12. Example of cleft neural arches.